Collaboration on ICT in Dutch Higher Education: The SURF Approach

By Petra Boezerooy, Bas Cordewener, and Wim Liebrand

In “Thinking Ahead: A Vision of the Role of ICT in Education and Research in the Future, 2007–2010,” the higher education institutions in the Netherlands agreed on future strategy. Under the direction of SURF, the Dutch national organization, a collaborative strategy for the application of information and communications technology (ICT) was formulated. The starting point for the strategy was the needs of individual users: how can higher education best organize and support the individual’s workflow with fast, secure, and relevant services?

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Since 1985, SURF (http://www.surf.nl/en) has served as the primary Dutch national cooperative organization for higher education and research partnership for network services and for ICT. The mission of SURF is to operate and innovate a joint advanced ICT infrastructure, fully utilizing the possibilities of ICT. SURF is responsible for one of the world’s leading national network infrastructures and cost-effective application providers. Within SURF, higher institutions cooperate to improve the quality of higher education and research, especially in situations where collaborative efforts exceed the possibilities of individual approaches. Of the Dutch higher education institutions and academic, science, and research institutions, 99 percent are members of SURF.

Government grants, membership fees, and payment for network services allow SURF to conduct a range of programs to support the institutions with a world-class network infrastructure and ICT-related services.

The strength of SURF as a national organization is the collaboration between all Dutch higher education and research institutions—a collaboration that is of growing importance as the direction of Dutch higher education is being strongly influenced by European policies such as the Bologna Declaration and the Bologna Process, the Lisbon Strategy, and the Berlin Declaration. These European policies pose challenges that can be met only by coordinated, collaborative action; SURF will take the lead in ICT-related developments.

**Bologna, Lisbon, Berlin, and the Consequences for Dutch Higher Education**

The current direction of Dutch higher education is heavily influenced by two major European political decisions: the Bologna Declaration (1999) and the Lisbon Strategy (2000). The Bologna Process started with the 1999 Bologna Declaration: reforms agreed upon by twenty-nine European governments in Bologna. The main characteristic of the Bologna Process is that it consists of several different, if interlocking, debates about degree structures, quality assurance, recognition, mobility, and the European curricular dimension. The Bologna Process currently involves a group of forty-five European countries that jointly work toward harmonizing national education systems in the European Union (EU) member states and creating a single European Higher Education Area (EHEA). The Netherlands responded to the Bologna Process by introducing the bachelor-master system, a renewed accreditation system, and the use of a European Credit Transfer System (ECTS).

The second European development determining the direction in which Dutch higher education will move is the Lisbon Strategy. This is a largely economically driven political strategy. In 2000, the European Council agreed to make Europe “the most competitive and dynamic knowledge-based economy in the world” by 2010. As a result of the Lisbon Strategy, the ministers of education of the European countries agreed on three major goals:

- To improve the quality and effectiveness of European education and training systems
- To ensure that education and training are accessible to all
- To open up education and training to the rest of the world

An additional development in both higher education and research is the Berlin Declaration (2003), which aims to make scientific knowledge and cultural heritage openly accessible to all. The EU European Commission focuses on higher education as the key factor in strengthening competitiveness, employment, and social cohesion. By integrating the European research policy with the Bologna Process, the European Commission has strengthened its influence on higher education developments in EU countries. The framing of policies concerning lifelong learning, e-learning, and research with the Bologna Process stimulates coordinated actions in EU countries. For the Netherlands, SURF is such a coordinating actor.

**SURF’s Vision and Programs**

To meet the challenges faced by higher education and research, the Dutch higher education and research institutions and SURF developed “Thinking Ahead: A Vision of the Role of ICT in Education and Research in the Future, 2007–2010.”

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According to this strategic plan, the ICT environment outside of the domain of higher education will become entwined with the ICT environment within the higher education domain in the coming years. Therefore, national and institutional ICT policies should not aim at further development of traditional “one size fits all” technologies but instead should focus on a technology approach that supports the individual user’s workflow, in order to offer fast, secure, and relevant ICT-related services. SURF therefore has identified four types of users and their expectations of the ICT environment (see Table 1).

Based on these expectations, ICT-related activities need to be developed and implemented. Here the existence of a collaborative organization such as SURF will prove to be valuable once more, because it can direct the cooperation of the institutions and manage the scalability and sustainability of the activities. SURF will play a decisive role with regard to mobilizing expertise, planning product

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<th>TYPE OF USER</th>
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| STUDENTS     | - An open, digitally facilitated educational offering  
               - The look-and-feel of a customary digital learning environment  
               - Uninterrupted educational pathways with a personal portfolio  
               - Web-based self-services |
| TEACHERS     | - A flexible, integrated, digitally facilitated teaching system  
               - Training facilities for educational innovation  
               - Easy access to educational and research content |
| RESEARCHERS  | - Collaboratories  
               - Transparent sharing of (expensive) research facilities  
               - Quality review without copyright transfer |
| INSTITUTIONS | - A reliable, easily managed, and secure ICT environment  
               - The ability to present itself in the digital domain  
               - A reduction in drop-out rates  
               - Collaboration with the region and with private enterprise  
               - Transparent information infrastructure and ICT governance  
               - Free access to its own products  
               - SURF initiatives in areas where this is profitable |

**TABLE 1. TYPES OF USERS AND THEIR EXPECTATIONS OF THE ICT ENVIRONMENT**
and service development, and running the overall program. SURF and Dutch higher education and research institutions will jointly undertake programs in the following areas: Research, E-Learning, Organization, and Communication Infrastructure.

Research
The main focus of the Research program is to create better and open access to high-grade scientific knowledge at low(er) costs. To achieve this, SURF, by means of the SURFshare program, will focus on the individual researcher by aiming at the development of a shared infrastructure to support the communication of and access to scientific results. The researcher must be enabled to easily create, record, and disseminate research information and to achieve maximum impact. The SURFshare program builds on the principles of the SURFdare program, which developed a national interoperable repository infrastructure to reinforce the communication cycle for the research community—specifically registration, long-term and dynamic archiving, and dissemination. In the coming period, these repositories will be the foundation for further innovation of scholarly communication and collaboration in the field of research, for example by compiling complex (“enhanced”) publications and enabling high-quality review and publication processes. The tasks and roles of researchers, institutions, university libraries, and publishers in these processes will change as the research and publishing processes become even more interwoven. This phenomenon and the increased possibilities in the field of knowledge sharing and dissemination will remove the absolute distinction between research data and the traditional publication as research output.

SURF will support researchers in their efforts to increase the effectiveness of exercising their copyrights, since the inclusion of enhanced publications in repositories will likely result in new legal challenges.
Furthermore, the SURFshare program will focus on the development of collaboratories. A collaboratory is a digital, Web-based collaborative association of researchers at several locations, virtually working together to share knowledge, tools, services, and sources. It is the perfect instrument to enhance and accelerate research in both national and international environments. Through the SURFshare program, SURF will also support researchers in their efforts to increase the effectiveness of exercising their copyrights, since the inclusion of enhanced publications in repositories will likely result in new legal challenges.

E-Learning
The main focus of the E-Learning program is to initiate, stimulate, and facilitate the innovative use of ICT in the higher education context. To achieve this, SURF, by means of the SURF Knowledge and Expertise Centre, will focus on two themes: dissemination and professionalization. Over the past years, SURF has invested heavily in innovation projects and the development of expert knowledge and disseminating services in the field of e-learning. As a rule, these projects were carried out by at least two or more collaborating higher education institutions. The compulsory cooperation with partners proved to be effective in the procurement of generic solutions. The projects mainly focused on the development and implementation of new (flexible) ways of learning and teaching in areas such as digital portfolio and assessment, gaming and simulation, and mobile learning. Furthermore, SURF, together with the higher education and research institutions, invested in building expert knowledge by means of establishing Special Interest Groups (communities that focus on subjects such as streaming media, digital portfolio, and standardization) and disseminating services (such as Web sites on “Good Practices” and “Digital Didactics”).

To further increase its effectiveness, SURF concentrates its dissemination and professionalization activities in the SURF Knowledge and Expertise Centre. The Centre will deploy dissemination activities that focus on broadening the institutional use, reuse, and implementation of project results developed by other higher education institutions. Another strand of activities will focus on stimulating and broadening the scope of knowledge and expertise of the communities and other human
networks. The Centre will deploy professionalization activities to increase the expertise and know-how within higher education institutions. The SURF Knowledge and Expertise Centre will reach out to students, teachers, educational technologists, and librarians. These target groups will become more acquainted with ICT-designed and ICT-facilitated education in courses, workshops, master classes, and summer schools. Subjects such as dissemination strategies and business models, implementation and change management, streaming media, and standardization will be addressed. Furthermore, SURF will connect the dissemination and professionalization activities in the SURF Knowledge and Expertise Centre to intensive networking and monitoring approaches.

Organization

The adaptation of a service-oriented approach is the leading principle of the new SURF strategic plan for 2007–10. In the Organization program, SURF will support higher education institutions in harmonizing their ICT facilities by developing and implementing a service-oriented architecture (SOA) and, on top of that, national and institutional services. The core idea of the service-oriented approach is that the needs of the end users should determine the ICT system architecture. At the application level, tailor-made services can be built by combining components. The service-oriented approach offers the flexibility that higher education institutions need to implement in order to offer ICT facilities that best support operational processes. An important condition for successful implementation of SOA is that higher education institutions describe their information architecture, in order to determine which building
blocks (or components) must be replaced or innovated. For the coming period, SURF will identify and disseminate best practices in the area of information architecture and SOA. In addition, SURF will develop a generic model for higher education to help individual institutions build their institutional architecture.

In this process of developing and implementing both national and institutional information architectures, the differences in the area of data definitions between institutions turn out to be relatively small. Therefore, collaboration in this area is obviously beneficial; a collaboratively developed information architecture, based on the SOA principles, leads to the efficient exchanges of information and data between higher education institutions, as well as between institutions and central organizations. SURF, by means of the project Studielink, allows higher education institutions to share and exchange student data with one another and with the central organization responsible for the information and administration of student affairs, such as grants and information management (IB-Group). Eventually, the complex exchanges of data between incompatible systems will be replaced by shared data sets used by tailor-made services.

Communication Infrastructure

For over twenty years, SURF has been responsible for the development and implementation of one of the fastest communication infrastructures in the world. For the coming period, SURF plans to make the infrastructure easier to use, increase the level of security, and offer more versatile functionality. SURF commits itself to a permanently available network that meets the highest standards of capacity, quality, and flexibility to meet increasing demands of individual users.
increasing demands of individual users. SURFnet, one of the two subsidiaries of SURF, is responsible for the development and exploitation of the network and the (technical) services the network provides. Of as much importance as the network infrastructure is the availability of affordable applications. For this purpose, the other subsidiary of SURF, SURFdiensten, negotiates with software vendors to acquire national licenses that allow students and staff to use software at a low price. The remit of SURFdiensten goes beyond higher education and software: licenses also apply to primary, secondary, and vocational education. Besides software, SURFdiensten offers subscriptions to online sources and consultancy contracts. Thanks to this national collaborative purchasing, all students and members of higher education institutions have access to a large number of commonly used applications. For the coming period, SURF will move its focus toward content supply, especially the opportunities for licensing educational content.

Conclusion
At the heart of SURF’s success lies the strong collaboration between all Dutch higher education and research institutions in the area of ICT-related activities. This collaboration needs to be continued in order to provide a simple and secure national network infrastructure. On the basis of this infrastructure, the services that support the working processes of individual users in the institutions can be initiated, developed, and implemented. The national collaboration is the winning ticket to building national and institutional human networks, to sharing knowledge and expertise, and to providing a world-class environment for Dutch education and research. By mobilizing the ideas and power of Dutch higher education and research institutions, SURF is contributing to a future-proof infrastructure for Dutch higher education and research.

Notes
2. ECTS is based on the principle that 60 credits measure the workload of a full-time student during one academic year. The student workload of a full-time study program in Europe amounts, in most cases, to around 1,500–1,800 hours per year, and in those cases, 1 credit stands for around 25 to 30 working hours (see <http://ec.europa.eu/education/programmes/socrates/ects/doc/ectskey_en.pdf>).